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Weekly Bulletin



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DIPHTHERIA AND DIPHTHERIA CARRIERS.

By GAVIN J. TELFER, M.D., State District Health Officer, Los Angeles.

From a public health standpoint the control of diphtheria carriers, the mild cases (those that have partial immunity and develop slight transient sore throat and a few constitutional symptoms and who become carriers) and missed cases (missed by both physician and the health officer) present the great problem in the reduction of diphtheria case incidence and the mortality rates. These are the three factors that make diphtheria endemic in every community. In a well organized community the toxic cases of diphtheria receive medical attention. The health department is notified, the case is quarantined and the contacts are isolated. The case is seen early; anti-toxin is administered by the physician and the probability of fatal termination of the case is nil. The family contacts are swabbed and cultured and they are given temporary immunization by anti-toxin, if necessary. Contact with the case from now on is limited to one attendant, preferably trained. Concurrent disinfection is carried out, so that the infectious material from the nose and throat is destroyed before being transferred to other individuals. The case recovers, two negative swabs are obtained after the tenth day of onset of the clinical symptoms and the case is released. Presumably this ends this particular focus. This would be so except that the successive negative swabs of both nose and throat do not necessarily mean that the person does not

still carry virulent bacilli of diphtheria hidden away in the crypts of the tonsils or in the nasal pharynx and the sinuses. The regulations of the state law have been carried out and if we were able to obtain cultures from the remote recesses of the naso-pharynx after a period of six months, we would find that many of our recovered cases still harbor virulent diphtheria organisms. Then we have three factors that are making diphtheria an undiminishing public health problem: the recovered legally-released cases, the missed cases and the carriers.

In a well organized community (and there are few of these from a public health standpoint) diphtheria may run a mild course, where the *bacillus diphtheriae* is of lowered virulence, or a particular group may have (to a small extent) some slight immunity. These mild cases are the missed cases—missed by the physician and the health officer. These missed cases are the ones that, uncontrolled, cause an abundance of contacts. A child may be moderately ill with sore throat over a week end during the holidays; there is no record of absence from school; the child returns to school carrying the infection of diphtheria and by close contact may infect a large proportion of his class and possibly the school. I have investigated such an incident where 50 per cent of the children of this child's schoolroom were shown bacteriologically to be positive for diphtheria, even including the teacher in a primary class, with five deaths resulting. The infected school child becomes the



carrier of diphtheria to the family. The other school children in the family become the source of infection for their school classes. The same applies to other communicable diseases, especially measles, also whooping cough and scarlet fever. The missed cases occur in greatest numbers in unorganized territory. In such territory not only a typical, but the toxic, cases are missed. In rural communities practically every family may have a chance to have brought home the virulent organisms of diphtheria, so the usual methods of the health department organization with enforcement of the state regulations are only partially effective. The positive reduction and absolute control of diphtheria depends on the production of universal immunity.

The third factor, and the largest, is the individual who has sufficient antitoxic and bactericidal bodies in his blood to protect himself from any toxic symptoms of diphtheria, but who is an incubator and disseminator of diphtheria—the carrier. These carriers become such by close contact with cases and other carriers. The diphtheria carrier is always with us. In the absence of toxic cases the finding of what are morphologically diphtheria bacilli in the throats of individuals is of little importance. The universal one per cent or more of carriers which occurs north or south of the tropics is of small importance in the control of diphtheria. We may have three or four per cent of the population of a community in this class of carriers. If there are no cases and no history of contact of known virulent organism, these cases are probably non-virulent. Even adult carriers of a known virulent diphtheria organism, who are limited in their contact to other adults and in no way become contact with children, are of little importance in diphtheria control. In one locality at one time we found about 5 per cent of the male oil field workers, who lived in their own boarding house, were carriers. Practically nothing was accomplished in excluding these from operation in the open oil fields. Adult carriers, except food handlers, especially milk handlers, and school teachers and those of like occupation where contact with children is probable are of little importance in diphtheria control.

The school-child carrier of diphtheria is the principal factor in the spread of this disease. The problem of handling and control of these carriers is the most difficult problem that the health department has to deal with and is becoming more so. There is increased opposition

to examination of school children for the determination of carriers. After the carrier is found there is increased opposition to restriction of this well child with resultant loss of school attendance. If cases of diphtheria are occurring in a school, particularly in one grade or room, then it is a proper procedure to locate the source of infection and it is necessary to swab the contacts. A few of the contacts may object under the state law which provides for "conscientious objectors." Then, if it is reasonably established that a child is a contact and there is a probability of his being infective, the child may be quarantined. The other opposition to control is from the families in which the child has been found to be a carrier and who continues to retain positive diphtheria organisms in his nose or throat or both and is, therefore, retained in quarantine or isolation for a long period.

There are two solutions for this problem. One is by medical and surgical treatment for the purpose of clearing this condition in the child. Medical treatment is unsatisfactory and the methods tried seem of little avail. Normal salt solution at the temperature of the body, used as an irrigation mechanically removing the infective material and inducing the mucous membrane to return to normal, seems the most effective. These cases mostly require surgical attention. The removal of tonsils with their deeply infected crypts and the adenoids is usually effective. The other solution of this problem is to limit the time in which a carrier may be held in restriction. If, after a period of six weeks, two consecutive negative swabs are not obtained, then an appeal may be made to the secretary of the State Board of Health, preferably through the recommendation of the attending physician and the health officer, and the case is released on executive order.

Another phase of the subject should be considered and this is especially important where the carrier is one who has not been in known contact with a diphtheria case. Tests for virulence should be made by injection of culture intracutaneously into a guinea pig.

Diphtheria is not showing a decrease in morbidity in the last few years. Our present methods of control by enforcement of the regulations are of some value in keeping the morbidity from increasing. The enlightenment of parents in the value of early administration of antitoxin will help reduce the mortality. Among the physicians there is need of enlightenment in the treatment of diphtheria. Too often the



attending physician, especially in rural communities, loses too much time in waiting for laboratory diagnosis. The antitoxin should be given on clinical diagnosis and confirmed later, if possible, by laboratory findings. We are also getting, it seems, complicated cases of diphtheria where the damage is done probably more by other organisms, especially streptococci. Treatment of such complicated cases will have to be modified. With all these things done we shall still have at least a high incidence in diphtheria morbidity even if we lessen the mortality, unless we resort to permanent immunization in wide-spread areas. This is especially applicable to institutions and to rural communities which can not have control and do not receive medical attention. The value of complete immunity in an institution was lately shown to be by Doctor Coulter in a case of smallpox occurring in the South Pasadena Orphanage. All the institution was immunized against smallpox. A case was brought into the Orphanage and there was considerable contact. There was absolutely no danger of the disease spreading. If diphtheria were brought in, such a condition would be the same, if the institution is immunized by the toxin-antitoxin method for diphtheria.



### Don't Kill a Dog Suspected of Rabies.

Several rabid dogs have been found in San Joaquin County and Dr. J. J. Sippy, health officer, has contributed a picturesque appeal to the residents of his district, urging them not to kill an animal suspected of being rabid. In this appeal, Dr. Sippy also effectively disposes of the "dog days" myth with relation to the prevalence of rabies. He says:

"If you happen to step on Towser's toes, or pull Fido's ears when he wants to sleep, don't be surprised if they retaliate by snapping at you. If they do, just remember it is the only way they have of defending themselves from your annoyances, and it does not necessarily mean they have 'gone mad.' Perhaps their fleas have been unusually 'pestiferous,' or they have been keeping late hours and haven't caught up on lost sleep. Perhaps Mrs. Towser has been nagging because she's misplaced a bone which she needed for lunch. At any rate, nine times out of ten they are simply temperamental and not afflicted with that dread disease, hydrophobia.

Above all things, don't rush for a gun and shoot them, for if it should happen that they are rabid you have destroyed the best way of making certain of it. Of course, you may send the brain into the laboratory, and by careful examination the laboratory may be able to give you a definite diagnosis.

On the other hand, if the dog does have rabies, he will most certainly die in four or five days, following a chain of very definite signs and symptoms. By tying or penning him up you can watch him and satisfy yourself as to what ails him far better than any laboratory can do it for you. So do this, instead of getting excited and killing him.

### ORIGIN OF 'DOG DAYS.'

These are what many people call 'dog days.' Many people associate this period with danger from rabies, and city councils or other city officials are inclined to wake up from their lethargy with regard to the disease, and pass ordinances or revive regulations concerning muzzling and other restrictions of dogs. This is all the more amusing because the term 'dog days' has no reference to dogs, but is borrowed from the Romans, who called Sirius, the brightest of fixed stars, the Dog Star. At one time during the Roman epoch the rising of this star coincided with the rising of the sun in the latter part of July. The twenty days preceding and twenty days following this conjunction were for the Romans 'dies canis,' the days of the dog or Dog Star. Rome had its fiercest heats usually during this period; therefore, the time was dreaded, and came to have the reputation of an unhealthy season, though not with any special reference to the dogs of Rome.

### RABIES MORE FREQUENT DURING WINTER.

In our day the meaning of 'dog days' is that dogs are especially likely to go mad at this time. The consequence is that we give great attention to and become hysterical about dog bites at this time of year, and utterly forget precautions at other seasons. Rabies may occur at any season of the year; actual statistics show greater frequency of the disease during the winter than during the summer months. It is more common in the early spring, and March and April would be a much better time to select for 'dog days' in the popular sense than the weeks of July and August that have by misapprehension come to be looked on as a special period of danger.

Keep this in mind: If Towser does bite, tie him or pen him up, but don't



kill him. Also notify the local health district office and members of its staff will keep him under observation until it can be positively determined that rabies is actually present. This course will materially add to peace of mind and still give plenty of time to institute preventive treatment if the disease should be present."

#### MORBIDITY.\*

##### Diphtheria:

96 cases of diphtheria have been reported, as follows: San Francisco 18, Los Angeles 17, Long Beach 5, Oakland 6, Fresno 6, Stanislaus County 5, Los Angeles County 10, Sonoma County 1, Alameda 2, Berkeley 4, Monterey County 1, Riverside 1, Tulare County 1, Napa 1, Merced 1, Santa Cruz 1, Bakersfield 1, Los Gatos 1, Madera 1, Burbank 1, Santa Cruz County 3, Stockton 1, LaVerne 2, Whittier 1, Santa Clara County 1, Sacramento 3, Santa Paula 1.

##### Measles.

23 cases of measles have been reported, as follows: Los Angeles 6, Los Angeles County 7, San Francisco 3, Hawthorne 1, Monrovia 1, Redding 2, Dinuba 1, Berkeley 1, Sonoma County 1.

##### Scarlet Fever.

30 cases of scarlet fever have been reported, as follows: Los Angeles 5, Los Angeles County 2, Stockton 1, Sacramento County 2, Sacramento 1, Bakersfield 1, Ceres 1, Monterey County 1, Orange County 3, San Francisco 4, Modoc County 4, Pasadena 1, Fresno 1, Tracy 1, Santa Clara County 1, Needles 1.

##### Smallpox.

37 cases of smallpox have been reported, as follows: Los Angeles 15, Los Angeles County 5, Oakland 2, San Francisco 1, Sacramento 3, Long Beach 1, Fresno 2, Santa Clara County 2, Alhambra 1, Tulare County 1, Bakersfield 2, Modoc County 1, Anaheim 1.

##### Typhoid Fever.

20 cases of typhoid fever have been reported, as follows: Santa Clara County 1, Lindsay 1, Benicia 1, Compton 1, San Mateo 1, Los Angeles 4, Pasadena 1, Visalia 1, Riverside 1, Santa Cruz 1, Chico 1, San Francisco 4, Fresno County 1, Anaheim 1.

##### Whooping Cough.

39 cases of whooping cough have been reported, as follows: Los Angeles 13, San Francisco 6, Los Angeles County 4, El Segundo 2, Alhambra 1, Eureka 1, Fullerton 3, Riverside 3, Alameda 3, Anaheim 3.

##### Cerebrospinal Meningitis.

2 cases of cerebrospinal meningitis have been reported, as follows: Los Angeles 1, Santa Paula 1.

##### Poliomyelitis.

Oakland reported 1 case of poliomyelitis.

##### Epidemic Encephalitis.

San Francisco reported one case of epidemic encephalitis.

##### Rabies (Human).

Los Angeles reported one case of rabies.

##### Typhus Fever.

Los Angeles reported one case of typhus fever.

\*From reports received on August 25 and 26 for week ending August 23.

#### COMMUNICABLE DISEASE REPORTS.

DISEASES	1924				1923			
	Week ending			Reports for week ending Aug. 23 received by Aug. 26	Week ending			Reports for week ending Aug. 25 received by Aug. 28
	Aug. 2	Aug. 9	Aug. 16		Aug. 4	Aug. 11	Aug. 18	
Anthrax.....	0	0	0	0	0	0	1	0
Botulism.....	0	0	0	0	0	0	0	0
Cerebrospinal Meningitis.....	2	1	3	2	1	5	3	0
Chickenpox.....	55	44	41	21	37	34	13	17
Diphtheria.....	137	153	104	96	99	112	116	116
Dysentery (Bacillary).....	0	0	11	1	2	2	17	6
Epidemic Encephalitis.....	4	2	2	1	4	2	1	2
Epidemic Jaundice.....	0	0	0	0	0	0	0	0
Gonorrhoea.....	64	108	270	93	93	127	77	51
Influenza.....	4	6	5	2	2	2	4	5
Leprosy.....	1	0	0	0	0	0	0	0
Malaria.....	1	1	0	2	2	5	8	3
Measles.....	43	35	23	23	194	177	170	153
Mumps.....	9	15	10	23	9	2	5	6
Pneumonia.....	18	29	19	11	27	41	82	14
Poliomyelitis.....	0	1	1	1	6	2	5	3
Rabies (human).....	0	0	0	1	0	0	0	1
Scarlet Fever.....	49	50	33	30	62	61	43	39
Smallpox.....	63	68	53	37	36	33	17	16
Syphilis.....	82	160	255	71	168	140	73	84
Tuberculosis.....	199	167	156	117	219	108	162	185
Typhoid Fever.....	22	27	8	20	30	23	47	22
Typhus Fever.....	0	0	1	1	0	2	0	0
Whooping Cough.....	78	55	67	39	69	69	86	43
Totals.....	831	922	1062	592	1060	947	930	767

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